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10/681,883	10/08/2003	Jeffrey Dyck	030216	9582

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EXAMINER	
PATEL, NIHAR P	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/681,883	DYCK ET AL.	
	Examiner	Art Unit	
	NIHAR PATEL	2416	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 October 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-49* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-49* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 101

Claims 1-3, 8-15 rejected under 35 U.S.C. 101 because the method claim as recited is not explicitly tied to a device or apparatus.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. **Claims 1-11. 14-20, 22-27, 32-37, 40-49** are rejected under 35 U.S.C. 103(a) as being unpatentable over "Improving Round-Trip Time Estimates in Reliable Transport Protocols" to *Karn et al.* ("*Karn*") in view of U.S. Patent No. 5,943,480 to *Neidhardt et al.* ("*Neidhardt*") and in further view of "IP Mobility Support" to *Perkins* ("*Perkins*").

As to **claim 1**, *Karn* discloses a method for determination of link latency in a communication network having a link, the method comprising steps of:

(c) initiating a current round trip estimation process having a start time and an end time; (*Karn* pg, 68, ll. 1-5 –describes a current round trip estimation using calculated round trip samples-) (d) setting a retry timer equal to the sum of a predetermined backoff period and the current estimated network delay; (*Karn* pg. 69, paragraph 2.2 –describes an RTO and a backoff time which is performed independently of the SRTT calculation-)

(e) if the retry timer expires before the end time of the potentially concurrent current round trip estimation process, updating the predetermined backoff period and repeating steps (c) and (d); (*Karn* pg. 69, paragraph 2.2 –describes updating the backoff and RTO when the timer expires-) and (f) resetting the current estimated delay equal to the difference between the end time of the current round trip estimation process and the start time of the current round trip estimation process. (*Karn* pg. 69, paragraph 2.2 –describes updating the SRTT with current values after each successful transmission-)

Karn does not expressly disclose (a) determining an unloaded network delay for round trip traversal of the link according to an initial registration process; (b) setting a current estimated delay equal to the unloaded network delay; *Karn* further does not expressly disclose a subsequent registration attempt

Neidhardt discloses an initial round trip time for an empty system. (*Neidhardt* col. 8, ll. 29-40)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the initial round trip estimate as disclosed by *Neidhardt* with the round trip estimate and retransmission time out calculation method as disclosed by *Karn*. The suggestion/motivation would have been to monitor acknowledgements so the transmitters can decide whether to retransmit packets (*Neidhardt* col. 2, ll. 8-15).

Perkins discloses a registration method for mobile IP networks. (Perkins pg. 24, 3 'Registration')

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods as disclosed by *Karn* and *Neidhardt* with the

system as disclosed by Perkins. The suggestion/motivation would have been to allow transparent routing of IP datagrams to mobile nodes in the Internet. (*Perkins* pg. 1, 'Abstract')

As to **claim 2**, the method of claim 1, further comprising an initial step of providing a wireless communication sub-network incorporating the link. (*Perkins* pg. 4, 1.4 –describes nodes that move from one IP subnet to another-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods as disclosed by *Karn* and *Neidhardt* with the system as disclosed by Perkins. The suggestion/motivation would have been to allow transparent routing of IP datagrams to mobile nodes in the Internet. (*Perkins* pg. 1, 'Abstract')

As to **claim 3**, the method of claim 2, wherein the wireless communication sub-network utilizes Mobile IP. (*Perkins* pg. 4, 1.4 –describes nodes that move from one IP subnet to another using Mobile IP-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods as disclosed by *Karn* and *Neidhardt* with the system as disclosed by Perkins. The suggestion/motivation would have been to allow transparent routing of IP datagrams to mobile nodes in the Internet. (*Perkins* pg. 1, 'Abstract')

As to **claim 4**, the method of claim 3, wherein the link further comprises a link between a mobile device and a home agent. (*Perkins* pg. 5, 1.5 -describes the functions of and between the mobile node and home agent-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods as disclosed by *Karn* and *Neidhardt* with the system as disclosed by Perkins. The suggestion/motivation would have been to allow transparent routing of IP datagrams to mobile nodes in the Internet. (*Perkins* pg. 1, 'Abstract')

As to **claim 5**, the method of claim 4, wherein the current round trip estimation (*Karn* pg, 68, ll. 1-5 –describes a current round trip estimation using calculated round trip samples-) process further comprises a re-registration subprocess. (Perkins pg. 35, paragraph 3 –describes reregistration-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods as disclosed by *Karn* and *Neidhardt* with the system as disclosed by Perkins. The suggestion/motivation would have been to allow transparent routing of IP datagrams to mobile nodes in the Internet. (*Perkins* pg. 1, 'Abstract')

As to **claim 6**, the method of claim 5, wherein the start time (*Karn* pg, 68, ll. 1-5 – describes the sender timing the process-) further comprises a send time of a re-

registration request. (Perkins pg. 35, paragraph 3 –reregistration -; pg. 25, 3.1 –describes registration request-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods as disclosed by *Karn* and *Neidhardt* with the system as disclosed by Perkins. The suggestion/motivation would have been to allow transparent routing of IP datagrams to mobile nodes in the Internet. (*Perkins* pg. 1, 'Abstract')

As to **claim 7**, the method of claim 5, wherein the end time (*Karn* pg, 68, ll. 1-5 – describes the sender timing the process-) further comprises a receipt time of a re-registration reply. (Perkins pg. 35, paragraph 3 –reregistration with foreign agent-; pg. 25, 3.1 –describes registration reply-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods as disclosed by *Karn* and *Neidhardt* with the system as disclosed by Perkins. The suggestion/motivation would have been to allow transparent routing of IP datagrams to mobile nodes in the Internet. (*Perkins* pg. 1, 'Abstract')

As to **claim 8**, a method for determination of link latency in a Mobile IP network, the method comprising steps of:

(a) determining an unloaded network delay (*Neidhardt* col. 8, ll. 29-40)

according to an initial registration process; pg. 25, 3.1 –describes registration process-) (b) setting a current estimated delay equal to the unloaded network delay; (*Neidhardt* col. 8, ll. 29-40)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the initial round trip estimate as disclosed by *Neidhardt* with the round trip estimate and retransmission time out calculation method as disclosed by *Karn*. The suggestion/motivation would have been to monitor acknowledgements so the transmitters can decide whether to retransmit packets (*Neidhardt* col. 2, ll. 8-15).

(c) upon commencement of a re-registration attempt, (Perkins pg. 35, paragraph 3 –reregistration with foreign agent-) noting a send time of a current round trip estimation process; (*Karn* pg, 68, ll. 1-5 –describes a current round trip estimation using calculated round trip samples-)

(d) setting a retry timer equal to the sum of a predetermined backoff period and the current estimated network delay; (*Karn* pg. 69, paragraph 2.2 –describes an RTO and a backoff time which is performed independently of the SRTT calculation-)

(e) and if the retry timer expires before receipt of a re-registration reply (Perkins pg. 35, paragraph 3 –reregistration with foreign agent-; pg. 25, 3.1 –describes registration reply-), updating the predetermined backoff period and repeating steps (d) and (e); (*Karn* pg. 69, paragraph 2.2 –describes updating the backoff and RTO when the timer expires-)

(f) and if the retry timer does not expire before receipt of the re-registration reply, noting the receipt time of the current round trip estimation process and resetting the current estimated delay equal to the difference between the receipt time and the send

time. (*Karn* pg. 69, paragraph 2.2 –describes updating the SRTT with current values after each successful transmission-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods as disclosed by *Karn* and *Neidhardt* with the system as disclosed by Perkins. The suggestion/motivation would have been to allow transparent routing of IP datagrams to mobile nodes in the Internet. (*Perkins* pg. 1, 'Abstract')

As to **claim 9**, the method of claim 8, wherein the initial registration process further comprises the steps of:

noting a send time (Neidhardt col. 8, ll. 55-65 –describes round trip transmission time-) of an initial registration request from the mobile device to the home agent; (Perkins, pg. 25, 3.1 –describes registration process-)

noting a receipt time (Neidhardt col. 8, ll. 55-65 –describes round trip transmission time-) of a registration reply corresponding to the initial registration request from the home agent to the mobile device; and (Perkins, pg. 29, 3.4 –describes the registration reply process-)

determining the unloaded network delay according to the formula:

RTT(0)=(RRP(initial)-RRQ(initial))- , (Neidhardt col. 8, ll. 55-65 –describes round trip transmission time where packet is sent and when acknowledgment is received which is equal to the variable R-) wherein RTT(0) represents the initial registration round

trip delay, RRP(initial) represents the receipt time of the initial registration reply (Perkins, pg. 29, 3.4 –describes the registration reply process-) sent by the HA, and RRQ(initial) represents the send time of the initial registration request. (Perkins, pg. 25, 3.1 –describes registration process-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods as disclosed by *Karn* and *Neidhardt* with the system as disclosed by Perkins. The suggestion/motivation would have been to allow transparent routing of IP datagrams to mobile nodes in the Internet. (*Perkins* pg. 1, 'Abstract')

As to **claim 10**, the method of claim 8, wherein the current round trip estimation (*Karn* pg, 68, ll. 1-5 –describes a current round trip estimation using calculated round trip samples-) process further comprises a re-registration subprocess. (Perkins pg. 35, paragraph 3 –reregistration with foreign agent-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods as disclosed by *Karn* and *Neidhardt* with the system as disclosed by Perkins. The suggestion/motivation would have been to allow transparent routing of IP datagrams to mobile nodes in the Internet. (*Perkins* pg. 1, 'Abstract')

As to **claim 11**, the method of claim 9, wherein the re-registration subprocess further comprises steps of:

noting the send time of an RRQ for re-registration (Perkins pg. 35, paragraph 3 –describes reregistration-); noting the receipt time of a corresponding RRP; and determining the current estimated round trip delay according to the formula: (*Karn* pg, 68, ll. 1-5 –describes a current round trip estimation using calculated round trip samples-)

RTT(current)=RRP(x_t)-RRQ(x_t),

wherein RTT(current) represents the current estimated round trip delay, RRP(x_t) represents the receipt time of the RRP associated with the current re-registration attempt(Perkins pg. 35, paragraph 3 –describes reregistration-), and RRQ(x_t) represents the send time of the RRQ associated with the current re-registration. (*Karn* pg, 68, ll. 1-5 –describes a current round trip estimation using calculated round trip samples, Examiner notes round trip calculation is well known in the art as described in *Neidhardt*-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the initial round trip estimate as disclosed by *Neidhardt* with the round trip estimate and retransmission time out calculation method as disclosed by *Karn*. The suggestion/motivation would have been to monitor acknowledgements so the transmitters can decide whether to retransmit packets (*Neidhardt* col. 2, ll. 8-15).

Furthermore, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods disclosed by *Karn* and *Neidhardt* into the Mobile IP system as disclosed by Perkins. The suggestion/motivation would have been to allow transparent routing of IP datagrams to mobile nodes in the Internet. (*Perkins* pg. 1, 'Abstract')

As to **claim 14**, the method of claim 8, wherein the current round trip estimation process further comprises a packet correlation process. (*Karn* pg, 68, ll. 1-5 –describes a packet being sent over a TCP connection, and round trip estimation is calculated by the timing of the acknowledgment-)

As to **claim 15**, the method of claim 14, wherein the packet correlation process further comprises the steps of:

noting the send time of a TCP packet sent from the mobile device to the home agent; noting the receipt time of a corresponding acknowledgment sent from the home agent to the mobile device; and determining the current estimated network delay according to the formula: RTT(current)=(ACK(receipt)-PACKET(send)), wherein RTT(current) represents the current estimated round trip delay, ACK(receipt) represents the receipt time of the acknowledgment, and PACKET(send) represents the send time of the TCP packet. (*Karn* pg, 68, ll. 1-5 –describes a packet being sent over a TCP connection, and round trip estimation is calculated by the timing of the acknowledgment which is then inserted into the SRTT formula-)

As to **claim 16**, a method for determination of unloaded link latency in a Mobile IP network, the method comprising steps of:

(a) noting a send time (Neidhardt col. 8, ll. 55-65 –describes round trip transmission time-) of an initial registration request from the mobile device to the home agent; (Perkins, pg. 25, 3.1 –describes registration process of mobile IP-) (b) noting a

receipt time (Neidhardt col. 8, ll. 55-65 –describes round trip transmission time-)of a registration reply corresponding to the initial registration request from the home agent to the mobile device; (Perkins, pg. 25, 3.1 –describes registration process of mobile IP-) (c) determining an unloaded network delay according to the formula:RTT(0)=(RRP(initial)-RRQ(initial)), (Neidhardt col. 8, ll. 55-65 –describes round trip transmission time where packet is sent and when acknowledgment is received which is equal to the variable R-)

wherein RTT(0) represents the initial registration round trip delay, RRP(initial) represents the receipt time of the initial registration reply, (Perkins, pg. 29, 3.4 –describes the registration reply process-) and RRQ(initial) represents the send time of the initial registration request; (Perkins, pg. 25, 3.1 –describes registration process-)

(e) noting a send time (*Karn* pg, 68, ll. 1-5 –describes a current round trip estimation using calculated round trip samples-) of a request for re-registration; (Perkins pg. 35, paragraph 3 –describes reregistration-)

(d) setting a current estimated delay equal to the unloaded network delay; (*Karn* pg. 69, paragraph 2.2 –describes an RTO and a backoff time which is performed independently of the SRTT calculation-)

(f) setting a retry timer equal to the sum of a predetermined backoff period and the current estimated network delay; (*Karn* pg. 69, paragraph 2.2 –describes an RTO and a backoff time which is performed independently of the SRTT calculation-)

(g) if the retry timer expires before receipt of a registration reply message, (Perkins pg. 35, paragraph 3 –describes reregistration-) updating the predetermined

backoff period and repeating steps (e), (f) and (g); and (*Karn* pg. 69, paragraph 2.2 – describes updating the backoff and RTO when the timer expires-)

(h) if the retry timer does not expire before receipt of the registration reply message, noting the receipt time of the re-registration reply message (Perkins pg. 35, paragraph 3 –describes reregistration-) and setting the current estimated delay equal to the difference between the receipt time and the send time. (*Karn* pg. 69, paragraph 2.2 – describes updating the SRTT with current values after each successful transmission-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the initial round trip estimate as disclosed by *Neidhardt* with the round trip estimate and retransmission time out calculation method as disclosed by *Karn*. The suggestion/motivation would have been to monitor acknowledgements so the transmitters can decide whether to retransmit packets (*Neidhardt* col. 2, ll. 8-15).

Furthermore, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods disclosed by *Karn* and *Neidhardt* into the Mobile IP system as disclosed by Perkins. The suggestion/motivation would have been to allow transparent routing of IP datagrams to mobile nodes in the Internet. (*Perkins* pg. 1, 'Abstract')

As to **claim 17**, a method for determination of link latency in a communication network having a link, the method comprising:

(a) a step for calculating an unloaded network delay for round trip traversal of the link according to an initial registration process; (*Neidhardt* col. 8, ll. 29-40) (b) a step for

establishing a current estimated delay according to the unloaded network delay; (*Neidhardt* col. 8, ll. 29-40)

(c) a step for adding a predetermined backoff period to the current estimated delay; (*Karn* pg. 69, paragraph 2.2 –describes an RTO and a backoff time which is performed independently of the SRTT calculation-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the initial round trip estimate as disclosed by *Neidhardt* with the round trip estimate and retransmission time out calculation method as disclosed by *Karn*. The suggestion/motivation would have been to monitor acknowledgements so the transmitters can decide whether to retransmit packets (*Neidhardt* col. 2, ll. 8-15).

(d) a step for setting a retry timer upon commencement of a Mobile IP registration attempt (Perkins pg. 24, 3 –discloses a Mobile IP registration-), the retry timer set according to the sum derived in step (c) (*Karn* pg. 69, paragraph 2.2 –describes an RTO and a backoff time which is performed independently of the SRTT calculation-);

(e) optionally, a step for initiating the current round trip delay estimation process; *Karn* pg, 68, ll. 1-5 –describes a current round trip estimation using calculated round trip samples-)

(f) if step (e) was initiated, a step for updating the current estimated round trip delay if the end event of the current round trip delay estimation process occurs; (*Karn* pg. 69, paragraph 2.2 –describes updating the SRTT with current values after each successful transmission-)

(g) a step for recalculating the backoff period and repeating steps (e) and (f) if the retry timer expires before the end time of the current round trip estimation process; and (*Karn* pg. 69, paragraph 2.2 –describes updating the backoff and RTO when the timer expires-)

(h) a step for determining the current estimated delay according to the difference between the end time of the current round trip estimation process and the start time of the current round trip estimation process, if the retry timer does not expire before the end time of the current round trip estimation process. (*Karn* pg. 69, paragraph 2.2 –describes updating the SRTT with current values after each successful transmission-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods as disclosed by *Karn* and *Neidhardt* with the system as disclosed by Perkins. The suggestion/motivation would have been to allow transparent routing of IP datagrams to mobile nodes in the Internet. (*Perkins* pg. 1, 'Abstract')

As to **claim 18**, the method of claim 17, further comprising an initial step of providing a wireless communication sub-network utilizing Mobile IP, wherein the wireless communication sub-network incorporates the link. (*Perkins* pg. 4, 1.4 –describes nodes that move from one IP subnet to another using Mobile IP-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods as disclosed by *Karn* and *Neidhardt* with the system as disclosed by Perkins. The suggestion/motivation would have been to allow

transparent routing of IP datagrams to mobile nodes in the Internet. (*Perkins* pg. 1, 'Abstract')

As to **claim 19**, the method of claim 18, wherein the link further comprises a link between a mobile device and a home agent. (*Perkins* pg. 5, 1.5 -describes the functions of and between the mobile node and home agent-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods as disclosed by *Karn* and *Neidhardt* with the system as disclosed by Perkins. The suggestion/motivation would have been to allow transparent routing of IP datagrams to mobile nodes in the Internet. (*Perkins* pg. 1, 'Abstract')

As to **claim 20**, the method of claim 17, wherein:

the current round trip estimation process (*Karn* pg, 68, ll. 1-5 –describes a current round trip estimation using calculated round trip samples-) further comprises a re-registration attempt (Perkins pg. 35, paragraph 3 –describes reregistration-); the start time further comprises a send time (*Karn* pg, 68, ll. 1-5 –describes the sender timing the process-) of a re-registration request (Perkins pg. 35, paragraph 3 –describes reregistration request-); and the end time further comprises the receipt time (*Karn* pg, 68, ll. 1-5 –describes the sender timing the process-) of a re-registration reply (Perkins pg. 35, paragraph 3 –describes reregistration reply-).

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods as disclosed by *Karn* and *Neidhardt* with the system as disclosed by Perkins. The suggestion/motivation would have been to allow transparent routing of IP datagrams to mobile nodes in the Internet. (*Perkins* pg. 1, 'Abstract')

As to **claim 22**, the method of claim 17, wherein the step for establishing a current estimated delay according to the unloaded network delay (*Neidhardt* col. 8, ll. 29-40) further comprises: a step for establishing a current estimated delay according to a packet subprocess. (*Karn* pg, 68, ll. 1-5 –describes a packet being sent over a TCP connection, and round trip estimation is calculated by the timing of the acknowledgment-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the initial round trip estimate as disclosed by *Neidhardt* with the round trip estimate and retransmission time out calculation method as disclosed by *Karn*. The suggestion/motivation would have been to monitor acknowledgements so the transmitters can decide whether to retransmit packets (*Neidhardt* col. 2, ll. 8-15).

As to **claim 23**, a communication network system having a link, the system comprising:

a first device; (*Perkins* pg. 5, '1.5', 'Mobile Node') a second device; (*Perkins* pg. 5, '1.5' , 'Home Agent')

a communication path linking the first device and the second device; (*Perkins* pg.4, '1.2'-'1.4' -describes the mobile node using a wireless link-) and

at least one module that determines the link latency associated with traversal of the communication path between the first device and the second device. (*Karn*, pg. 67-68, '2. The TCP Algorithm' -describes the sender using an algorithm to determine round trip time-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods as disclosed by *Karn* and *Neidhardt* with the system as disclosed by Perkins. The suggestion/motivation would have been to allow transparent routing of IP datagrams to mobile nodes in the Internet. (*Perkins* pg. 1, 'Abstract')

As to **claim 24**, the system of claim 23, wherein: the first device further comprises a mobile device; (*Perkins* pg. 5, '1.5', 'Mobile Node') and the second device further comprises a home agent. (*Perkins* pg. 5, '1.5' , 'Home Agent')

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods as disclosed by *Karn* and *Neidhardt* with the system as disclosed by Perkins. The suggestion/motivation would have been to allow transparent routing of IP datagrams to mobile nodes in the Internet. (*Perkins* pg. 1, 'Abstract')

As to **claim 25**, the system of claim 24, further comprising an intermediary device for relaying communication between the mobile device and the home agent via the communication path. (*Perkins*, pg. 5, 'Foreign Agent' -describes an intermediary device-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods as disclosed by *Karn* and *Neidhardt* with the system as disclosed by Perkins. The suggestion/motivation would have been to allow transparent routing of IP datagrams to mobile nodes in the Internet. (*Perkins* pg. 1, 'Abstract')

As to **claim 26**, the system of claim 23, wherein the at least one module further comprises:

an unloaded delay module for determining the unloaded network delay for round trip traversal of the link according to an initial registration process; a current estimated delay module for setting a current estimated delay equal to a provided network delay value; a request send time module for noting the start time of a current round trip estimation process; (*Neidhardt* col. 8, ll. 29-40; Fig. 2, -describes monitors which calculate the round trip time for an empty system which sends a packet and receives an acknowledgment to calculate R, which is used for the current estimated delay-)

a retry timer module for setting a retry timer equal to the sum of predetermined backoff period and the current estimated network delay upon commencement of a current round trip estimation process having a start time and an end time; (*Karn* pg. 69,

paragraph 2.2 –describes the sender calculating an RTO and a backoff time which is performed independently of the SRTT calculation-)

a timer expiration module for updating the predetermined backoff period and notifying the retry timer module if the retry timer expires before the end time of the current round trip estimation process; (*Karn* pg. 69, paragraph 2.2 –describes a sender updating the backoff and RTO when the timer expires-)

a registration reply (Perkins pg. 24, 3 'Registration') receipt time module for noting the end time of a current round trip estimation process; and (*Karn* pg, 68, ll. 1-5 – describes a sender calculating current round trip estimation using calculated round trip samples-)

a reset module for setting the current estimated delay equal to the difference between the end time of the current round trip estimation process and the start time of the current round trip estimation process. (*Karn* pg. 69, paragraph 2.2 –describes a sender updating the SRTT with current values after each successful transmission-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the initial round trip estimate as disclosed by *Neidhardt* with the round trip estimate and retransmission time out calculation method as disclosed by *Karn*. The suggestion/motivation would have been to monitor acknowledgements so the transmitters can decide whether to retransmit packets (*Neidhardt* col. 2, ll. 8-15).

Furthermore, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods disclosed by *Karn* and *Neidhardt* into the Mobile IP system as

disclosed by Perkins. The suggestion/motivation would have been to allow transparent routing of IP datagrams to mobile nodes in the Internet. (*Perkins* pg. 1, 'Abstract')

As to **claim 27**, the system of claim 26, wherein:

the current round trip estimation process further comprises a re-registration subprocess; (*Perkins* pg. 35, paragraph 3 –describes reregistration-) the start time (*Karn* pg, 68, ll. 1-5 –describes a sender calculating current round trip estimation using calculated round trip samples-) further comprises a send time of a re-registration request (*Perkins* pg. 35, paragraph 3 –describes reregistration request-); nd the end time (*Karn* pg, 68, ll. 1-5 –describes a sender calculating current round trip estimation using calculated round trip samples-) further comprises a receipt time of a re-registration reply (*Perkins* pg. 35, paragraph 3 –describes reregistration reply-).

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods as disclosed by *Karn* and *Neidhardt* with the system as disclosed by Perkins. The suggestion/motivation would have been to allow transparent routing of IP datagrams to mobile nodes in the Internet. (*Perkins* pg. 1, 'Abstract')

As to **claim 32**, a communication network, comprising:

means for providing a first device; (*Perkins* pg. 5, '1.5', 'Mobile Node')

means for providing a second device; (*Perkins* pg. 5, '1.5' , 'Home Agent')

means for communication between the first device and the second device; (*Perkins* pg.4, '1.2'-'1.4' -describes the mobile node using a wireless link-)

means for determining an unloaded network delay for round trip traversal of the link (*Neidhardt* col. 8, ll. 29-40; Fig. 2, -describes monitors which calculate the round trip time for an empty system which sends a packet and receives an acknowledgment to calculate R-) during initial Mobile IP registration; (Perkins pg. 24, 3 'Registration')

means for setting a current estimated delay equal to the unloaded network delay; (*Neidhardt* col. 8, ll. 29-40; Fig. 2, -describes monitors which calculate the round trip time for an empty system which sends a packet and receives an acknowledgment to calculate R, which is used for the current estimated delay-)

means for setting a retry timer equal to the sum of a predetermined backoff period and the current estimated network delay; (*Karn* pg. 69, paragraph 2.2 –describes the sender calculating an RTO and a backoff time which is performed independently of the SRTT calculation-)

means for updating the predetermined backoff period and resetting the retry timer equal to the sum of the predetermined backoff period and the current estimated network delay when the retry timer expires before an end time of a current round trip estimation process; and (*Karn* pg. 69, paragraph 2.2 –describes a sender updating the backoff and RTO when the timer expires-)

means for resetting the current estimated delay equal to the difference between the end time of the current round trip estimation process and a start time of the current round trip estimation process when the retry timer does not expire prior to the end time of a

current round trip estimation process . (*Karn* pg. 69, paragraph 2.2 –describes a sender updating the SRTT with current values after each successful transmission-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the initial round trip estimate as disclosed by *Neidhardt* with the round trip estimate and retransmission time out calculation method as disclosed by *Karn*. The suggestion/motivation would have been to monitor acknowledgements so the transmitters can decide whether to retransmit packets (*Neidhardt* col. 2, ll. 8-15).

Furthermore, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods disclosed by *Karn* and *Neidhardt* into the Mobile IP system as disclosed by Perkins. The suggestion/motivation would have been to allow transparent routing of IP datagrams to mobile nodes in the Internet. (*Perkins* pg. 1, 'Abstract')

As to **claim 33**, the network of claim 32, further comprising a wireless communication sub-network employing Mobile IP. (*Perkins* pg. 4, 1.4 –describes nodes that move from one IP subnet to another using Mobile IP-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods as disclosed by *Karn* and *Neidhardt* with the system as disclosed by Perkins. The suggestion/motivation would have been to allow transparent routing of IP datagrams to mobile nodes in the Internet. (*Perkins* pg. 1, 'Abstract')

As to **claim 34**, the network of claim 33, wherein:

the means for providing the first device further comprises a mobile device; (*Perkins* pg. 5, '1.5', 'Mobile Node') and the means for providing the second device further comprises a home agent. (*Perkins* pg. 5, '1.5', 'Home Agent-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods as disclosed by *Karn* and *Neidhardt* with the system as disclosed by Perkins. The suggestion/motivation would have been to allow transparent routing of IP datagrams to mobile nodes in the Internet. (*Perkins* pg. 1, 'Abstract')

As to **claim 35**, the network of claim 34, further comprising an intermediary device for relaying communications between the mobile device and the home agent via the means for communication. (*Perkins*, pg. 5, 'Foreign Agent' -describes an intermediary device-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods as disclosed by *Karn* and *Neidhardt* with the system as disclosed by Perkins. The suggestion/motivation would have been to allow transparent routing of IP datagrams to mobile nodes in the Internet. (*Perkins* pg. 1, 'Abstract')

As to **claim 36**, the network of claim 34, wherein the Mobile IP registration further comprises an initial registration process. (Perkins pg. 24, 3 'Registration')

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods as disclosed by *Karn* and *Neidhardt* with the system as disclosed by Perkins. The suggestion/motivation would have been to allow transparent routing of IP datagrams to mobile nodes in the Internet. (*Perkins* pg. 1, 'Abstract')

As to **claim 37**, the network of claim 36, wherein the initial registration process further comprises:

means for noting a send time (*Karn* pg, 68, ll. 1-5 –describes a sender calculating current round trip estimation using calculated round trip samples-)of an initial registration request from the mobile device to the home agent; (*Perkins* pg. 35, paragraph 3 – describes reregistration-)

means for noting a receipt time (*Karn* pg, 68, ll. 1-5 –describes a sender calculating current round trip estimation using calculated round trip samples-)of a registration reply corresponding to the initial registration request from the home agent to the mobile device; and (*Perkins* pg. 35, paragraph 3 –describes reregistration-)

means for determining the unloaded network delay according to the formula:

RTT(0)=(RRP(initial)-RRQ(initial)), (*Neidhardt* col. 8, ll. 29-40; Fig. 2, - describes monitors which calculate the round trip time for an empty system which sends a packet and receives an acknowledgment to calculate R, which is used for the current-)

wherein RTT(0) represents the initial registration round trip delay, RRP(initial) represents the receipt time of the initial registration reply (*Perkins* pg. 35, paragraph 3 –

describes reregistration-), and RRQ(initial) represents the send time of the initial registration request. (*Perkins* pg. 35, paragraph 3 –describes reregistration-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the initial round trip estimate as disclosed by *Neidhardt* with the round trip estimate and retransmission time out calculation method as disclosed by *Karn*. The suggestion/motivation would have been to monitor acknowledgements so the transmitters can decide whether to retransmit packets (*Neidhardt* col. 2, ll. 8-15).

Furthermore, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods disclosed by *Karn* and *Neidhardt* into the Mobile IP system as disclosed by Perkins. The suggestion/motivation would have been to allow transparent routing of IP datagrams to mobile nodes in the Internet. (*Perkins* pg. 1, 'Abstract')

As to **claim 40**, the network of claim 34, further comprising a packet correlation subprocess for current estimated round trip delay determination. (*Karn* pg, 68, ll. 1-5 – describes a packet being sent over a TCP connection, and round trip estimation is calculated by the timing of the acknowledgment-)

As to **claim 41**, the network of claim 40, wherein the packet correlation process further comprises:

means for noting the send time of a TCP packet sent from the mobile device to the home agent; means for noting the receipt time of a corresponding acknowledgment sent

from the home agent to the mobile device; and means for determining the unloaded network delay according to the formula (*Neidhardt* col. 8, ll. 29-40):

RTT(t)=(ACK(receipt)-PACKET(send)),

wherein RTT(t) represents the current packet round trip delay value at time t, ACK(receipt) represents the receipt time of the acknowledgment, and PACKET(send) represents the send time of the TCP packet.

(*Karn* pg, 68, ll. 1-5 –describes a current round trip estimation using calculated round trip samples to see how long it takes for a packet to be acknowledged from first being sent. Examiner notes round trip calculation formula is well known in the art as described in *Neidhardt* -)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the initial round trip estimate as disclosed by *Neidhardt* with the round trip estimate and retransmission time out calculation method as disclosed by *Karn*. The suggestion/motivation would have been to monitor acknowledgements so the transmitters can decide whether to retransmit packets (*Neidhardt* col. 2, ll. 8-15).

As to **claim 42**, the network of claim 34, wherein:

the current round trip estimation process further comprises a re-registration attempt; (*Perkins* pg. 35, paragraph 3 –describes reregistration-)

the start time (*Karn* pg, 68, ll. 1-5 –describes a sender calculating current round trip estimation using calculated round trip samples-)further comprises a send time of a re-registration request; (*Perkins* pg. 35, paragraph 3 –describes reregistration request-)and

the end time(*Karn* pg, 68, ll. 1-5 –describes a sender calculating current round trip estimation using calculated round trip samples-) further comprises a receipt time of a re-registration reply. (*Perkins* pg. 35, paragraph 3 –describes reregistration reply-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods as disclosed by *Karn* and *Neidhardt* with the system as disclosed by Perkins. The suggestion/motivation would have been to allow transparent routing of IP datagrams to mobile nodes in the Internet. (*Perkins* pg. 1, 'Abstract')

As to **claim 43**, A wireless communication sub-network, comprising:

a mobile station; (*Perkins* pg. 5, '1.5', 'Mobile Node')

a home agent; (*Perkins* pg. 5, '1.5' , 'Home Agent')

a communication path linking the mobile station and the home agent; (*Perkins* pg.4, '1.2'-'1.4' -describes the mobile node using a wireless link-) and

at least one module for determining latency between the mobile station and the home agent. (*Karn*, pg. 67-68, '2. The TCP Algorithm' -describes the sender using an algorithm to determine round trip time-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods as disclosed by *Karn* and *Neidhardt* with the system as disclosed by Perkins. The suggestion/motivation would have been to allow transparent routing of IP datagrams to mobile nodes in the Internet. (*Perkins* pg. 1, 'Abstract')

As to **claim 44**, the sub-network of claim 43, further comprising an intermediary device. (*Perkins*, pg. 5, 'Foreign Agent' -describes an intermediary device-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods as disclosed by *Karn* and *Neidhardt* with the system as disclosed by Perkins. The suggestion/motivation would have been to allow transparent routing of IP datagrams to mobile nodes in the Internet. (*Perkins* pg. 1, 'Abstract')

As to **claim 45**, the sub-network of claim 44, wherein the intermediary device further comprises at least one device selected from the group consisting of a foreign agent; a mobility anchor point; and a packet data serving node(*Perkins*, pg. 5, 'Foreign Agent' -describes an intermediary device-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods as disclosed by *Karn* and *Neidhardt* with the system as disclosed by Perkins. The suggestion/motivation would have been to allow transparent routing of IP datagrams to mobile nodes in the Internet. (*Perkins* pg. 1, 'Abstract')

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As to **claim 46**, the sub-network of claim 43, wherein the mobile station further comprises at least one component selected from the group consisting of a terminal equipment, a mobile device, a transmitter, and a receiver. (*Perkins* pg. 5, '1.5', 'Mobile

Node' –wherein the mobile node can be a router or host that either transmits or receives or both-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods as disclosed by *Karn* and *Neidhardt* with the system as disclosed by Perkins. The suggestion/motivation would have been to allow transparent routing of IP datagrams to mobile nodes in the Internet. (*Perkins* pg. 1, 'Abstract')

As to **claim 47**, the sub-network of claim 43, wherein the at least one module further comprises at least one module selected from the group consisting of an unloaded network delay module; a current estimated delay module; a request send time module; a retry timer module; a timer expiration module; a registration reply module; and a reset module. (*Neidhardt* col. 8, ll. 29-40; Fig. 2, -describes monitors which calculate the round trip time for an empty system which sends a packet and receives an acknowledgment to calculate R, which is used for the current-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the initial round trip estimate as disclosed by *Neidhardt* with the round trip estimate and retransmission time out calculation method as disclosed by *Karn*. The suggestion/motivation would have been to monitor acknowledgements so the transmitters can decide whether to retransmit packets (*Neidhardt* col. 2, ll. 8-15).

As to **claim 48**, a Mobile IP communications network, comprising:

a mobile device; (*Perkins* pg. 5, '1.5', 'Mobile Node' –wherein the mobile node can be a router or host that either transmits or receives or both-)

a home agent; (*Perkins* pg. 5, '1.5' , 'Home Agent')

means for communication between the mobile device and the home agent; (*Perkins* pg.4, '1.2'-'1.4' -describes the mobile node using a wireless link-)

means for noting a send time (*Karn* pg, 68, ll. 1-5 –describes a sender calculating current round trip estimation using calculated round trip samples-) of an initial registration request from the mobile device to the home agent via the means for communication; (Perkins pg. 24, 3 'Registration')

means for noting a receipt time (*Karn* pg, 68, ll. 1-5 –describes a sender calculating current round trip estimation using calculated round trip samples-) of a registration reply corresponding to the initial registration request from the home agent to the mobile device via the means for communication; (Perkins pg. 24, 3 'Registration')

means for determining the unloaded network delay according to the formula:

RTT(0)=(RRP(initial)-- RRQ(initial)), (*Neidhardt* col. 8, ll. 29-40; Fig. 2, -describes monitors which calculate the round trip time for an empty system which sends a packet and receives an acknowledgment to calculate R, which is used for the current estimation-)

wherein RTT(0) represents the initial registration round trip delay, RRP(initial) represents the receipt time of the initial registration reply (Perkins pg. 24, 3 'Registration'), and RRQ(initial) represents the send time of the initial registration request; (Perkins pg. 24, 3 'Registration')

means for setting a current estimated delay equal to the unloaded network delay; (*Neidhardt* col. 8, ll. 29-40; Fig. 2, -describes monitors which calculate the round trip time for an empty system which sends a packet and receives an acknowledgment to calculate R, which is used for the current estimation-)

means for noting a send time (*Karn* pg, 68, ll. 1-5 –describes a sender calculating current round trip estimation using calculated round trip samples-) of a request for re-registration from the mobile device to the home agent via the means for communication; (*Perkins* pg. 35, paragraph 3 –describes reregistration-)

means for setting a retry timer equal to the sum of a predetermined backoff period and the current estimated network delay; (*Karn* pg. 69, paragraph 2.2 –describes the sender calculating an RTO and a backoff time which is performed independently of the SRTT calculation-)

means for updating the predetermined backoff period and means for resetting the retry timer if the retry timer expires before receipt of a registration reply message; (*Karn* pg. 69, paragraph 2.2 –describes a sender updating the backoff and RTO when the timer expires-)

means for noting the receipt time (*Karn* pg, 68, ll. 1-5 –describes a sender calculating current round trip estimation using calculated round trip samples-) of the registration reply message from the home agent to the mobile device via the communications path; (*Perkins* pg. 35, paragraph 3 –describes reregistration-)

and means for setting the current estimated delay equal to the difference between the receipt time (end event) and the send time (start event). (*Karn* pg. 69, paragraph 2.2 –

describes a sender updating the SRTT with current values after each successful transmission-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the initial round trip estimate as disclosed by *Neidhardt* with the round trip estimate and retransmission time out calculation method as disclosed by *Karn*. The suggestion/motivation would have been to monitor acknowledgements so the transmitters can decide whether to retransmit packets (*Neidhardt* col. 2, ll. 8-15).

Furthermore, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods disclosed by *Karn* and *Neidhardt* into the Mobile IP system as disclosed by Perkins. The suggestion/motivation would have been to allow transparent routing of IP datagrams to mobile nodes in the Internet. (*Perkins* pg. 1, 'Abstract')

As to **claim 49**, a Mobile IP communications network, comprising:

a mobile device; (*Perkins* pg. 5, '1.5', 'Mobile Node' –wherein the mobile node can be a router or host that either transmits or receives or both-)

a home agent; (*Perkins* pg. 5, '1.5' , 'Home Agent')

a communication path linking the mobile device and the home agent; (*Perkins* pg.4, '1.2'-'1.4' -describes the mobile node using a wireless link-)

an unloaded network delay module (*Neidhardt* col. 8, ll. 29-40; Fig. 2, -describes monitors which calculate the round trip time for an empty system which sends a packet and receives an acknowledgment to calculate R, which is used for the current estimation-) for determining an unloaded network delay for traversal of the communication path

between the mobile device and the home agent according to an initial registration process; (Perkins pg. 24, 3 'Registration')

a current estimated delay module for setting a current estimated delay equal to the unloaded or loaded network delay; (*Neidhardt* col. 8, ll. 29-40; Fig. 2, -describes monitors which calculate the round trip time for an empty system which sends a packet and receives an acknowledgment to calculate R, which is used for the current estimation-)

a request send (*Perkins* pg. 35, paragraph 3 –describes reregistration request-) time module for noting a send time of a request for re-registration between the mobile device and the home agent via the communication path; (*Karn* pg, 68, ll. 1-5 –describes a sender calculating current round trip estimation using calculated round trip samples-)

a retry timer module for setting a retry timer equal to the sum of a predetermined backoff period and the current estimated network delay; (*Karn* pg. 69, paragraph 2.2 – describes the sender calculating an RTO and a backoff time which is performed independently of the SRTT calculation-)

a timer expiration module for updating the predetermined backoff period and notifying the retry timer module if the retry timer expires before receipt of a re-registration reply (*Perkins* pg. 35, paragraph 3 –describes reregistration request-) message from the home agent to the mobile device via the communication path; (*Karn* pg. 69, paragraph 2.2 –describes a sender updating the backoff and RTO when the timer expires-)

a registration reply receipt (*Perkins* pg. 35, paragraph 3 –describes reregistration reply-) time module for noting the receipt time of the re-registration reply message by the

mobile device; and (*Karn* pg, 68, ll. 1-5 –describes a sender calculating current round trip estimation using calculated round trip samples-)

a reset module for setting the current estimated delay equal to the difference between the receipt time and the send time. (*Karn* pg. 69, paragraph 2.2 –describes a sender updating the SRTT with current values after each successful transmission-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the initial round trip estimate as disclosed by *Neidhardt* with the round trip estimate and retransmission time out calculation method as disclosed by *Karn*. The suggestion/motivation would have been to monitor acknowledgements so the transmitters can decide whether to retransmit packets (*Neidhardt* col. 2, ll. 8-15).

Furthermore, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods disclosed by *Karn* and *Neidhardt* into the Mobile IP system as disclosed by Perkins. The suggestion/motivation would have been to allow transparent routing of IP datagrams to mobile nodes in the Internet. (*Perkins* pg. 1, 'Abstract')

3. **Claims 12, 13, 21, 28-31, 38, 39** are rejected under 35 U.S.C. 103(a) as being unpatentable over *Karn*, *Neidhardt* and *Perkins* as applied to claim 8 above, in further view of U.S. Patent No. 6,757,255 B1 to *Aoki* et al ("*Aoki*").

As to **claim 12**, *Karn*, *Neidhardt* and *Perkins* disclose the method of claim 8. .*Karn*, *Neidhardt* and *Perkins* do not expressly disclose wherein the current round trip estimation process further comprises an echo subprocess.

Aoki discloses a packet transmitting/receiving unit measuring the round trip time of an ICMP echo message. (Aoki col. 12, ll. 11-20)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods as disclosed by *Karn, Neidhardt* , and *Perkins* with the system as disclosed by *Aoki*. The suggestion/motivation would have been to measure the round trip time by use of "echoping." (*Aoki* col. 12, ll. 21-24)

As to **claim 13**, the method of claim 12, wherein the echo process further comprises the steps of:

noting a send time of an ICMP echo request from the mobile device to the agent device; noting the receipt time of a corresponding ICMP echo from the agent device to the mobile device; (Perkins, pg. 25, 3.1 –describes registration process of mobile IP-) and determining the current estimated network delay according to the formula:RTT(current)=(EC- HO(receive)-ECHO(send)), wherein RTT(0) represents the current estimated round trip delay, ECHO(receive) represents the receipt time of the corresponding ICMP echo received from the home agent, and ECHO(send) represents the send time of the ICMP echo request. (*Aoki* col. 12, ll. 11-20 –describes a method of measuring the round trip time of an echo request, where the measurement is taken when the request is sent and an acknowledgement is received-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods as disclosed by *Karn, Neidhardt* , and

Perkins with the system as disclosed by *Aoki*. The suggestion/motivation would have been to measure the round trip time by use of "echoping." (*Aoki* col. 12, ll. 21-24)

As to **claim 21**, the method of claim 17, wherein the step for establishing a current estimated delay further comprises: a step for establishing a current estimated delay according to an echo subprocess. (Aoki col. 12, ll. 11-20)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods as disclosed by *Karn, Neidhardt* , and *Perkins* with the system as disclosed by *Aoki*. The suggestion/motivation would have been to measure the round trip time by use of "echoping." (*Aoki* col. 12, ll. 21-24)

As to **claim 28**, the system of claim 27, wherein the current round trip estimation process further comprises a process selected from a group consisting of a re-registration subprocess; (*Perkins* pg. 35, paragraph 3 –describes reregistration reply-) an echo subprocess; (*Aoki* col. 12, ll. 11-20 –describes a method of measuring the round trip time of an echo request, where the measurement is taken when the request is sent and an acknowledgement is received-) and a packet subprocess. (*Karn* pg, 68, ll. 1-5 –describes a sender calculating current round trip estimation using calculated round trip samples for TCP-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods as disclosed by *Karn, Neidhardt* , and *Perkins* with the system as disclosed by *Aoki*. The suggestion/motivation would have been to measure the round trip time by use of "echoping." (*Aoki* col. 12, ll. 21-24)

As to **claim 29**, the system of claim 28, wherein the re-registration process (*Perkins* pg. 35, paragraph 3 –describes reregistration-) further comprises:

noting a send time (*Karn* pg, 68, ll. 1-5 –describes a sender calculating current round trip estimation using calculated round trip samples-) of a re-registration request from the mobile device to the home agent; (*Perkins* pg. 35, paragraph 3 –describes reregistration-)

noting a receipt time (*Karn* pg, 68, ll. 1-5 –describes a sender calculating current round trip estimation using calculated round trip samples-) of a re-registration reply corresponding to the initial registration request from the home agent to the mobile device; and (*Perkins* pg. 35, paragraph 3 –describes reregistration-)

determining the unloaded network delay according to the formula:

RTT(current)=(RRP(x_t)-RRQ(x_t)), (*Neidhardt* col. 8, ll. 29-40; Fig. 2, -describes monitors which calculate the round trip time for an empty system which sends a packet and receives an acknowledgment to calculate R, which is used for the current-) wherein RTT(current) represents the current estimated round trip delay, RRP(x_t) represents the receipt time of the RRP associated with the current re-registration attempt, and RRQ(x_t) represents the send time of the RRQ associated with the current re-registration. (*Perkins* pg. 35, paragraph 3 –describes reregistration-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods as disclosed by *Karn* and *Neidhardt* with the system as disclosed by Perkins. The suggestion/motivation would have been to allow

transparent routing of IP datagrams to mobile nodes in the Internet. (*Perkins* pg. 1, 'Abstract')

As to **claim 30**, the system of claim 28, wherein the echo subprocess further comprises:

noting a send time of an ICMP echo request from the mobile device to the agent device; noting the receipt time of a corresponding ICMP echo from the agent device to the mobile device; and determining the loaded network delay according to the formula:

RTT(t)=(ECHO(receive)-ECHO(send)),

wherein RTT(current) represents the current estimated round trip delay, ECHO(receive) represents the receipt time of the corresponding ICMP echo received from the home agent, and ECHO(send) represents the send time of the ICMP echo request. (*Aoki* col. 12, ll. 11-20 –describes a method of measuring the round trip time of an echo request, where the measurement is taken when the request is sent and an acknowledgement is received-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods as disclosed by *Karn, Neidhardt* , and *Perkins* with the system as disclosed by *Aoki*. The suggestion/motivation would have been to measure the round trip time by use of "echoping." (*Aoki* col. 12, ll. 21-24)

As to **claim 31**, the system of claim 28, wherein the current round trip estimation process further comprises:

noting the send time of a TCP packet sent from the mobile device to the home agent; noting the receipt time of a corresponding acknowledgment sent from the home agent to the mobile device; and determining the loaded network delay according to the formula:

RTT(t)=(ACK(receipt)-PACKET(send)),

wherein RTT(0) represents the current estimated round trip delay, ACK(receipt) represents the receipt time of the acknowledgment, and PACKET(send) represents the send time of the TCP packet. (*Karn* pg, 68, ll. 1-5 –describes a current round trip estimation using calculated round trip samples to see how long it takes for a packet to be acknowledged from first being sent. Examiner notes round trip calculation formula is well known in the art as described in *Neidhardt* -)

As to **claim 38**, the network of claim 34, further comprising an additional network (Aoki Fig. 11) and an associated echo subprocess for current estimated round trip delay determination. (*Aoki* col. 12, ll. 11-20 –describes a method of measuring the round trip time of an echo request, where the measurement is taken when the request is sent and an acknowledgement is received-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods as disclosed by *Karn, Neidhardt* , and *Perkins* with the system as disclosed by *Aoki*. The suggestion/motivation would have been to measure the round trip time by use of “echoping." (*Aoki* col. 12, ll. 21-24)

As to **claim 39**, the network of claim 38, wherein the echo process further comprises:

means for noting a send time of an ICMP echo request from the mobile device to the agent device;

means for noting the receipt time of a corresponding ICMP echo from the home agent to the mobile device; and

means for determining the unloaded network delay according to the formula:

RTT(t)=(ECHO(receive)-ECHO(send)),

wherein RTT(t) represents the current echo round trip delay value at time t, ECHO(receive) represents the receipt time of the corresponding ICMP echo received from the home agent, and ECHO(send) represents the send time of the ICMP echo request. (*Aoki* col. 12, ll. 11-20; Fig. 11 –describes a method of measuring the round trip time of an echo request, where the measurement is taken when the request is sent and an acknowledgement is received-)

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to incorporate the methods as disclosed by *Karn, Neidhardt* , and *Perkins* with the system as disclosed by *Aoki*. The suggestion/motivation would have been to measure the round trip time by use of "echoping." (*Aoki* col. 12, ll. 21-24)

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NIHAR PATEL whose telephone number is (571) 270-

5690. The examiner can normally be reached on Monday-Thursday, 9:00AM-5:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Derrick W. Ferris can be reached on (571)272-3123. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/N. P./
Examiner, Art Unit 2416

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